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ELECTROPHOTOGRAPHIC PROCESSING TECHNIQUES

STAT CONTRACT [redacted] TASK ORDER NO. 03(100,762)65-R

Monthly Narrative Report - August 1965

This is the second of a series of monthly narrative reports on a study of electrophotographic processing techniques. The study comprises the investigation and development of photographic and electronic techniques for processing photographic images. This report covers the work performed by the [redacted] during the period from 22 July to 22 August 1965. (Project personnel participated in a two-week Division shutdown for vacation ending 1 August 1965.)

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A. Current Status of Work

1. Photographic Processing. The key to photographic processing will be control of acutance and granularity by adjustment of density thresholds, expansion and contraction of densities, and variation of the illuminating spot from a modulated-light source. Most of the special test equipment required to perform these tasks was delivered. Also, construction of the new photographic laboratory was nearly completed. The improved facilities are expected to be operational by the end of August.

A schedule for calibrating the special test equipment has been prepared. Standardization is required to properly relate the findings of this study to the photographic community. The effort will call upon the pertinent experience of the National Bureau of Standards.

The development of the modulated-light contact printer is proceeding satisfactorily. The design is essentially completed and most of the parts have been ordered. The printer will operate in a vertical

configuration with the kinescope at the bottom and the observation or set-up screen at eye level. Most of the elements of the system (e.g., lenses, film press, and partially-reflecting mirror) will be movable along a column adapted from a standard drill press.

2. Electronic Processing. The key to electronic processing, analogous to photographic processing, will be separate and simultaneous operation on the high and low frequency information in the photographic images. Breadboard equipment to evaluate critical aspects of the proposed high-resolution processing system has been assembled and operated.

Preliminary tests have shown the two-kinescope system to be stable. In application of the principle of color separation, the sensing light (3750 Å) passes through the transparency and to the multiplier phototube through a filter which effectively removes the modulated yellow light (5700 Å). Thus, either a positive or negative light mask may be registered with the transparency without system oscillation--over a bandwidth from dc to 20 megacycles and with full system gain.

Light measurements were made with unexposed film in contact with a transparency. Seven types of Kodak film, including some made without the usual anti-halation backing, were tested. Type No. 2427 produced the least attenuation at 3750 Å, but the system did not yield a fully-modulated picture. Apparently, more light or higher gain is needed.

B. Problem Areas Encountered

1. Photographic Processing. Assistance is required in obtaining GEMS (Graded Estimated Measuring Samples) for image quality determinations and Edge-GEMS for edge gradient measurements. The desired GEM parameters must still be specified.

2. Electronic Processing. In order to obtain a fully-modulated picture with the proposed electronic processing system, either more light or higher gain is needed. The latter may be achieved with a 15-stage multiplier phototube driving a lower-noise amplifier input stage (e.g., a cascoded stage).

C. Projected Work for Next Monthly Period

1. Photographic Processing

a. Calibration of special test equipment.

b. Continued investigation of the intensity/density properties of preselected films.

c. Experimental determination of the intensity/density properties of the ten film chips provided by the Technical Representative of the Contracting Officer.

d. Preliminary processing of the film chips.

e. Specification of desired GEM and Edge-GEM parameters.

f. Continued development (completed construction) of the modulated-light contact printer.

2. Electronic Processing

a. Continued measurement of the light characteristics of the breadboard system.

b. Modification of system components (e.g., the feedback amplifier).

c. Continued design of the high-resolution electronic processing system.

D. Status of Fund Expenditures to End of Monthly Period

Funds expended at break-even level to 29 August 1965:

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E. Documentation of Verbal Committments and/or Agreements During the Period

1. Desired GEM and Edge-GEM parameters will be specified by the end of the next monthly period.

2. The Technical Representative will attempt to facilitate exchanges of pertinent information between project personnel and various members of the photographic community (including the National Bureau of Standards).